Implementation of Biofuel Production in Developing Countries

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PhD Research Topic:
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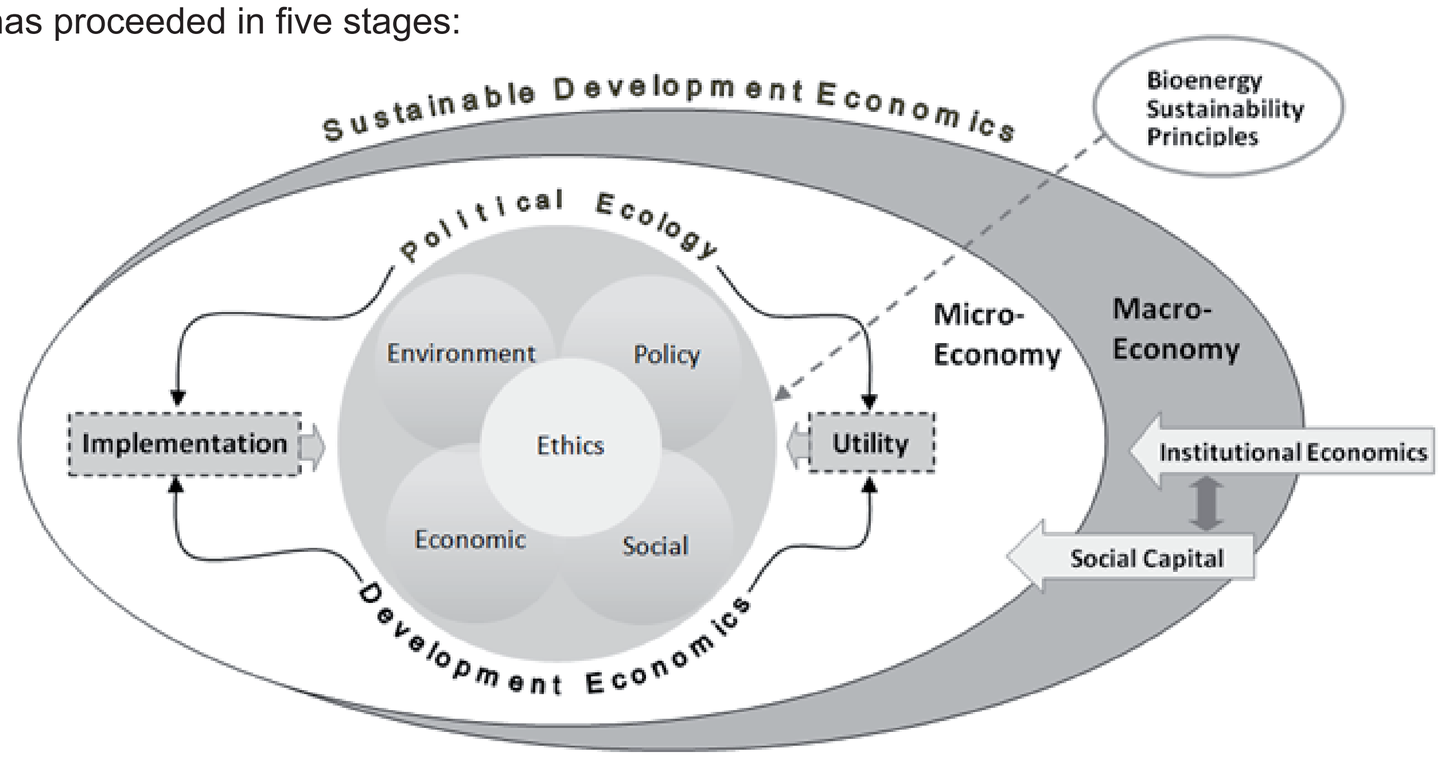
OVERVIEW

The depletion of fossil fuels is a global issue; likewise, the pursuit of national energy security through reducing dependence on certain countries (e.g. those belonging to the Organization of the Petroleum Exporting Countries) cannot be decoupled from international relations and globalization. While some experts argue that in many developing countries, biofuels provide an opportunity to address poverty and energy issues (Johnson et al., 2009), others note that challenges such as food security could be exacerbated by the expansion of biofuel production (Drexler, 2008).

Much of the expansion in biofuel cultivation is expected to take place in Africa, raising a number of socio-economic and environmental concerns. One area in need of further clarity is the issue of exploitation of local farmers (e.g. marginalization through land and water appropriation), alongside weak governance in developing countries (Franco et al., 2010; Wilkinson and Herrera, 2008). Considerable effort has been put into developing sustainability assessment frameworks for biofuel production in developing countries. Nevertheless, their successful implementation remains problematic in developing countries.

Moving towards sustainable biofuel development, this research attempts to identify knowledge gaps that currently challenge the implementation of biofuel sustainability principles in emerging economies. Sustainability is depicted as “a more decentralised way of life based upon greater self-reliance, so as to create a social and economic system less destructive towards nature” (Henderson, 1999:102). This research has proceeded in five stages:



(1) A literature review identifying limitations and opportunities relating to biofuel production (especially in sub-Saharan Africa).
(2) Theoretical framings that corresponded with the interlinking socio-environmental-economic qualities and principles for achieving sustainability through ethical implementation conformity (political ecology, development economics, social capital and institutional economics) were then used to inform a conceptual framework developed to assist biofuel implementation in sub-Saharan Africa.
(3) A survey was conducted involving thirty-eight international experts selected for their expertise in the fields of environmental, social and economic sustainability where the outcome informed an expert perspective of biofuel challenges and opportunities for biofuel development in sub-Saharan Africa.
(4) Two case studies were conducted in Zimbabwe and two in Zambia, entailing semi-structured interviews to ascertain views from affected stakeholders (local farmers, local environmental, social, and agronomic experts, and investors) on the biofuel projects and their environmental and social impacts. Outcomes included the sustainability impacts and local concerns resulting from the various biofuel project types, scale of operation and species choices.
(5) Having identified the sustainability limitations, the combined interests of the four supporting theories presents an inclusive frame from which to analyze and better understand and attend to the challenges towards sustainable biofuel production in developing countries.

The findings suggest that imbalances in the distribution of costs and benefits are brought about by social and political factors (often associated with broader discourses of development), and this provides a likely rationale for a lack of sustainability in biofuel projects. A holistic and principled advisory/mediating body that pays attention to detail, and has an understanding of local and project aspects alike, can assist to integrate the different interests of diverse stakeholders, and intertwine and reconcile ethical project governance with sustainability principles. The relationship of biofuel sustainability principles and supporting theories to inform biofuel implementation (which can inform policy) is illustrated below.

Finally, a set of potential analytic tools to attend to the sustainability challenges at different stages of biofuel implementation were identified for further theoretical debate and empirical research. Sustainability assessment, equitable power, integration of diverse viewpoints, effective participation, harmonizing sustainability, monitoring sustainability, equal costs and benefits, and ethics were identified as key limitations to effective biofuel implementation.

KEY REFERENCES

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